

TECHNOLOGY@ROCKY FLATS

Demonstration & Deployment Summary

Aviation ground support equipment adapted for nuclear waste load-out at Rocky Flats

Summary

D&D workers at Rocky Flats' Building 776/777 Closure Project were severely limited in their ability to safely and efficiently remove D&D waste from the second floor of the building. The project found part of the solution at the airport. With assistance from DOE-EM's Office of Science and Technology, the project successfully adapted existing technology – the Main Deck Loader 40 (MDL-40), typically used on airport runways to load and unload items from cargo aircraft – to solve their

D&D waste removal problem. By modifying the MDL-40 and integrating it with rad containment and transportation measurement/certification equipment, workers safely raised, loaded and removed the first of what will likely be more than 100 waste cargos through a specially designed containment port in the wall on the building's second floor.. The adaptation will reduce both industrial and radiological hazards and allow the 776/777 D&D project to avoid a significant loss of schedule.

The Problem

Building 776/777 was faced with the challenge of moving waste off of its second floor. Waste movement was not able to keep pace with new generation by D&D crews. Types of waste generated on the second floor include ventilation ducting, plenum filters, asbestos waste, etc. These wastes are suitable for disposal in cargo containers. The only avenue to remove waste from the second floor was using a single elevator. Waste removal efforts also involved repeated handling of radioactive waste as it traversed the second floor, was size-reduced to fit in the elevator, lowered to the first floor, and then traversed the first floor on the way to a first-floor dock. Project employees determined it would be much more



In August 2003, building 776/777 waste crews safely off-loaded the first full cargo container of SCO waste from the second floor using the modified MDL-40. Use of the MDL-40 is demonstrating improved safety and reduced cost and schedule risk.

efficient to be able to direct-load this waste into a cargo container through a second floor load-out. The inability for waste movement to keep pace with D&D was a bottleneck to D&D work with potential impacts to the overall schedule and project efficiency. Problems with removing B776 equipment are a site priority, since this is one of the buildings on the closure critical path.

An Alternative

At Rocky Flats, the precedent for second-floor waste loadout involved

the construction of a permanent structural steel platform on concrete footers and the use of a crane to raise and lower cargo containers. In Building 707, a permanent platform was constructed to take care of its second floor waste. While this is working well for 707, it involves using a crane to pick the cargo off an elevated platform at a cost of \$600 per crane pick. Because of overhead obstructions and limited space in the vicinity of B776, the use of a crane in this area would challenge safe operations. Additionally, the second floor load-out will only be required for the next 8-12 months. It does not make sense to construct a permanent new fixture that would then have to be demolished, creating more waste and costing more money for the project. And, repetitive crane picks of cargo containers full of radioactive waste presents a special risk for B776 where high voltage power lines run close to the wall.

The Solution

The solution involved the transfer and adaptation of technology used in the aviation industry for use as a nuclear waste load-out mechanism. The equipment used was a MDL-40 that is typically used on airport runways to load and unload items from cargo aircraft. To date, this equipment has never



Modifications to the MDL-40 included the addition of a pendant control that allowed operators to use the main control station from ground level (left) and an aluminum plate that allowed the rollers to adapt to the waste cargo containers used at Rocky Flats (above).

been used outside of the aviation industry. The 40,000-pound lift capacity equipment was modified for use to allow the direct load-out of Surface Contaminated Object low-level waste and asbestos waste from the second floor of B776/777. The ability of the MDL-40 to lower its platform to approximately 20 inches and raise it to 18 feet 4 inches made it fully functional without the use of a crane.

The demonstration and testing of this technology solution required...

- The hole in the wall and installation of a roll up door.
- Clearing of an area for placement of equipment.
- Fabrication of special mats or cribbing to support the weight of the equipment plus a full cargo (approximately 100,000 pounds combined).
- Adaptation of dock plates.
- Some building-specific preparations such as removal of some low-hanging piping.

In order to be used as a nuclear waste load-out technology, the MDL-40 had to be modified and improved.

- Controls had to be altered to allow the equipment to be used in the reverse position
- Safety mechanisms and mechanical adjustments allowed the MDL-40 to remain in the up position for days at a time
- A remote-control pendant was added for ease of operation and to eliminate the need for ladders
- Safety straps were incorporated to keep the cargo from shifting during operations
- Guards, cages and bumpers were added to improve safety
- An aluminum plate was fabricated to allow the waste cargo container bottom to fit snugly to the rollers for optimal movement
- A load cell was installed to certify cargo weight based on tension on the lifting chains.

The Benefits

In August 2003, Building 776/777 waste crews safely off-loaded the first full cargo container of SCO waste from the second floor using the modified MDL-40. The MDL-40 is an improvement over the baseline technology for the following reasons:

- **Safety** – The potential for hoisting and rigging incidents and crane-electrical incidents are two of our highest ranked safety risks at RFETS. Eliminating the need for repetitive crane operations significantly enhances safety.

- **ALARA** – Reduction in waste handling, size reduction and in the distance the waste has to travel from its point of generation to the waste container. This reduces potential exposure, potential cutting injuries from size-reduction, and the potential for the breach of non-containerized waste.

- **Schedule Risk Reduction** – Given the uncertainties tied to the 776/777 building demolition, it is imperative to keep 776/777 off the closure critical path. Potential shut-downs from hoisting-rigging incidents are to be avoided at all costs. In addition to closure risk, there will also be time/opportunity savings – crews that would have been constructing the platform and doing the crane picks can support other urgent closure projects.

- **Cost** – Capitol cost savings of \$40,000 over construction of permanent platform. Operating cost savings of \$86,400 for crane operations (savings of \$600 per pick) for building 776/777 alone. The system can also be used for 371 and is being evaluated for a second load-out for Building 707. Other sites in the complex will benefit even more, as the design and operating procedures can be directly transferred. Demolition and disposal savings are \$30,000 relative to D&D of the baseline equipment.

For more information on the modified MDL-40 load-out system at Rocky Flats, contact Jennifer Thompson, Kaiser-Hill Company, (303) 966-6285.



Cargo containers can be loaded onto the MDL-40 using a powered industrial fork truck instead of a crane, improving safety and reducing costs.



Technology Supporting the Path to Closure

For more information about Technology at Rocky Flats, contact David Maloney, Kaiser-Hill Company, (303) 966-7566, or Gary Huffman, DOE, Rocky Flats Field Office, (303) 966-7490

